ATTACHMENT 6
INSTRUMENT CALIBRATION PLAN
&
INCINERATOR WASTE FEED INTERLOCK FUNCTION TEST

Table of Contents

LIST of TABLES

List of Acronyms

ACAMS	Automatic Continuous Air Monitoring System
ACS	Agent Collection System
AQS	Agent Quantification System
BDS	Bulk Drain Station
BRA	Brine Reduction Area
CEMS	Continuous Emission Monitoring System
DFS	Deactivation Furnace System
HWMU	Hazardous Waste Management Units
LIC	Liquid Incinerator System
MDM	Multipurpose Demilitarization Machines
MPF	Metal Part Furnace System
PAS	Pollution Abatement System
PDAR	Process Data Acquisition and Recording
PLC	Programmable Logic Controller
RCRA	Resource Conservation Recovery Act
SDS	Spent Decontamination System
TOCDF	Tooele Chemical Agent Disposal Facility

6.1 SCOPE

6.1.1 This Calibration Plan:

6.1.1.1 Describes the basis for assigning TAG IDs to the various instruments and alarms associated with components of the process control systems for Subpart X treatment units, tanks, and incinerators.

6.1.1.2 Identifies components of the process control system associated with an incinerator requiring proper operation to ensure proper waste treatment, to stop/prevent the feeding of hazardous waste to an incinerator should the magnitude of permit regulated operating parameters exceed limits imposed by permit condition, and to demonstrate compliance with the conditions of this Permit.

6.1.1.3 Identifies components of the process control system associated with permitted tank requiring proper operation to determine accurate volumes of liquid wastes stored in tanks, to prevent the overtopping of tanks, and to demonstrate compliance with Permit conditions limiting the volume of hazardous waste stored in tanks.

6.1.1.4 Identifies components of the process control system associated with permitted Subpart X treatment unit requiring proper operation to ensure proper waste treatment, to stop/prevent the feeding of hazardous waste to Subpart X treatment unit, should the magnitude of permit regulated operating parameters exceed limits imposed by permit condition, and to demonstrate compliance with the conditions of this Permit.

6.1.1.5 Differentiates between instrumentation calibrated by the user and instrumentation calibrated by the manufacturer.

6.1.1.6 Differentiates between instrumentation that is calibrated and function tested, and instrumentation that is function tested only.

6.1.1.7 Describes the methods used to verify operational accuracy (i.e., function test) and calibrate different types of process control instrumentation associated with the demonstration of compliance with the conditions of this Permit.

6.1.1.8 Describes the methods used to function test the waste feed interlock system associated with each incinerator and the overtop protection system associated with each tank.

6.2 INSTRUMENT/ALARM TAG ID NOMENCLATURE

6.2.1 A unique TAG ID is used to identify each instrument and alarm. An instrument's TAG ID is stamped on a tag physically attached to (or in close proximity to) the instrument. Each instrument TAG ID is comprised of a two-digit prefix "system identifier," followed by a three or four-letter "instrument type identifier," followed by a one to three-digit suffix "instrument number."

6.2.2 The two-digit prefix "system identifier" and the corresponding systems are presented below:

SYSTEM IDENTIFIER	CORRESPONDING SYSTEM
11-XXX-XXX	Toxic Cubicle (TOX) Includes Agent Collection System associated with ACS-TANK-101 & ACS-TANK-102 and Spent Decontamination System associated with SDS-TANK-101, SDS-TANK-102 & SDS-TANK-103
13-XXX-XXX	Liquid Incinerator Systems (LIC 1, & LIC 2)
14-XXX-XXX	Metal Part Furnace System (MPF)
16-XXX-XXX	Deactivation Furnace System (DFS)
23-XXX-XXX	Brine Reduction Area System including: BRA-TANK-101, BRA-TANK-102, BRA-TANK-201, BRA-TANK-202, BRA-EVAP-101, BRA-EVAP-201, BRA-DDYR-101, BRA-DDYR-102, and BRA–DDYR-201
24-XXX-XXX	Incinerator Pollution Abatement Systems: LIC 1 PAS, LIC 2 PAS, MPF PAS, & DFS PAS
27-XXX-XXX	Brine Reduction Area Pollution Abatement System including BRA PAS Baghouse Modules: BRA-SEPA-101, BRA-SEPA-102, BRA-SEPA-103, and BRA-SEPA-104
49-XXX-XXX	Bulk Drain Station (BDS) Agent Quantification System associated with the Bulk Drain Stations (i.e., load cells): BDS-101, & BDS-102
51-XXX-XXX	Agent Collection System (ACS) Agent Quantification Systems associated with the Rocket Shear Machines: RSM-101, & RSM-102, and the Multipurpose Demil Machines: MDM-101, MDM-102, & MDM-103

6.2.3 The following three or four-letter codes are used to identify different types of instruments:

3-4 LETTER CODES	INSTRUMENT TYPE
XX-AIT-XXX	Analyzer Indicator Transmitters includes Continuous Emission Monitors for oxygen, carbon monoxide, & carbon dioxide, and pH analyzers
XX-DIT-XXX	Density Indicator Transmitters
XX-FIT-XXX	Flow Indicator Transmitters
XX-LIT-XXX	Level Indicator Transmitters
XX-PIT-XXX	Pressure Indicator Transmitters
XX-PDIT-XXX	Pressure Differential Indicator Transmitters
XX-PDT-XXX	Pressure Differential Transmitters
XX-TIT-XXX	Temperature Indicator Transmitters
XX-WIT-XXX	Weight Indicator Transmitters
PAS-XXX	Chemical Agent Monitors

6.2.4 The three-digit numeric suffix is used to differentiate between individual instruments of the same type.

6.2.5 Even though instruments of the same type share the same three or four-letter "instrument type identifier" code, and some instruments share the same one to three-digit suffix, a unique TAG ID exists for each instrument since the complete TAG ID is composed of 1) the System ID Code, 2) the three or four-letter instrument type identifier and 3) the one to three-digit suffix instrument number.

6.2.6 TAG IDs describing alarm and switch waste feed interlocks are derived from the instrument TAG IDs by replacing the last two letters in the instrument type identifier code with one of the following combinations of letters:

TAG ID	ALARM & SWITCH FEED INTERLOCK
XX-XAL-XXX	Alarm Low
XX-XALL-XXX	Alarm Low Low
XX-XDALL-XXX	Differential Alarm Low Low
XX-XSLL-XXX	Switch Low Low
XX-XAH-XXX	Alarm High
XX-XAHH-XXX	Alarm High High
XX-XDAH-XXX	Differential Alarm High
XX-XSHH-XXX	Switch High High

6.2.7 The "A" and "S" letters in the waste feed interlock TAG ID are used to differentiate between waste feed interlocks activated by switches located in the field and waste feed interlocks activated by monitored process values exceeding setpoints established in the Programmable Logic Controller (PLC) software.

6.2.7.1 "A" designates a waste feed interlock that is activated when the magnitude of the four to 20 milliamp control signal output from a specific transmitter exceeds a setpoint established in the PLC software. The transmitter sending the control signal causing the waste feed interlock can be determined by associating the first letter in the waste feed interlock TAG ID with the three-digit suffix. As an example, 13-TAHH-610 (Temperature Alarm High High) is generated when the control signal output from temperature transmitter 13-TIT-610 which monitors the exhaust gas temperature of the LIC 1 primary chamber exceeds the setpoint established in the PLC software.

6.2.7.2 The instrument causing the waste feed interlock is the transmitter sending the control signal, referring to the above example, 13-TIT-610. An instrument with the TAG ID 13-TAHH-610 does not exist.

6.2.7.3 "S" designates a change in state of a switch (which can be identified in the field by the TAG ID stamped on the tag attached to the instrument) causes the waste feed interlock. As an example, a pressure above atmospheric in the LIC 1 primary chamber causes 13-PSHH-233 (LIC 1 Pressure Switch #233 High High) to open. When this switch is open, waste feed is stopped/prevented.

6.3 INSTRUMENT CALIBRATION & PREVENTATIVE MAINTENANCE METHODS[1]

6.3.1 Overview

[1] In this plan, the tolerance or accuracy to which an instrument is calibrated is expressed as "percent of span." Span is defined as the arithmetic difference between an instrument's lower and upper range.

6.3.1.1 Preventative maintenance performed on components of the TOCDF incinerators and tank process control systems consists of function/accuracy tests and/or re-calibration.

6.3.1.2 Preventative maintenance on user-calibrated instrumentation consists of function/accuracy tests and re-calibration if necessary.

6.3.1.3 A commercially available process instrumentation calibration system is used at the TOCDF. The calibration system allows the user to download data specific to each instrument to be calibrated. The downloaded calibrator is then taken to the field and used to input (or used to enable the input of) artificial process values into the instrument being calibrated. As the artificial process values are being input, the calibrator compares and records the instruments output. Depending on the output, the instrument is either left as is, or adjusted so that the output is within the pre-established percentage of the expected value.

6.3.1.4 The "as found" and "as left" outputs of the instrument are recorded by the calibrator. Calibration results are then downloaded from the calibrator to a database and both an electronic and hard copy record of each calibration event are maintained.

6.3.1.5 For instrumentation calibrated by the manufacturer, preventative maintenance performed by the user consists of periodic accuracy/function tests only.

6.3.1.6 The results of function tests are not recorded in the instrument calibration system database for instruments calibrated by the manufacturer. Proper calibration of manufacturer-calibrated instruments is demonstrated by the certificate of calibration provided by the manufacturer and the completed preventative maintenance procedure log sheet.

6.3.1.7 At the conclusion of each function/accuracy test (and re-calibration if necessary) the validity of the data being sent by the transmitter to the control room advisor screen is tested by a procedure referred to as a "loop check".

6.3.1.8 Loop checks are accomplished through coordination between the instrument technician performing the calibration and control room operators. The instrument technician injects various artificial control signal values into the instrument and informs the control room operator of the magnitude of the injected value. The control room operator then determines (by knowing the strength of the signal being injected and the span over which the transmitter is calibrated to) the accuracy of the entire control loop. The results of loop checks are recorded on log sheets that are kept on file and attached to the hard copy of each function/accuracy test result and/or calibration event.

6.4 INSTRUMENT PREVENTATIVE MAINTENANCE/CALIBRATION METHODS

6.4.1 Analyzer Indicator, Transmitters (XX-AIT-XXX)

6.4.1.1 Continuous Emission Monitoring Systems

6.4.1.1.1 The certification and calibration of hazardous waste incinerator exhaust gas CO and O_2 Continuous Emission Monitoring Systems (CEMS) are regulated by Federal Regulations found in 40 CFR 266, Appendix IX.

6.4.1.1.2 These regulations specify required methods, frequencies, and accuracies to which the CEMS must be certified, calibrated, and audited. These include daily Calibration Drift (CD) tests, quarterly Calibration Error (CE) tests, and annual performance specification tests (PSTs).

6.4.1.1.3 CO and O_2 CEMS will be managed (i.e, certified, calibrated and audited) as specified in 40 CFR 266, Appendix IX and outlined in the TOCDF CEMS Monitoring Plan (CDRL 06).

6.4.1.2 pH Analyzers

6.4.1.2.1 pH analyzers are used to control the capability of PAS scrubber solutions to absorb acid gases exhausted by the incinerators. The PAS process control system of each incinerator is equipped with two analyzers monitoring scrubber brine pH. Both analyzers sample the same location in the process stream. Only one analyzer is active at any one time. The active analyzer is used to control pH. The analyzer designated to be active is alternated at equal intervals.

6.4.1.2.2 pH analyzers are calibrated by immersing the sensing element in certified buffer solutions at a pH of 4, 7, and 10 and observing the pH analyzer transmitter's output. The transmitter is determined to be properly calibrated if the output of the transmitter is within ±2.0% of the expected value. pH analyzer transmitters are calibrated at least once every seven days.

6.4.1.2.3 As the calibration history on each pH analyzers develops, the users will be able to determine the stability of the analyzer (i.e., the tendency of the analyzer's transmitter to drift out of calibration).

6.4.1.2.4 If waste feed to an incinerator is discontinued for a period longer than seven days, calibration of the pH analyzer/transmitter associated with the incinerator is suspended but will be done prior to the resumption of waste feed.

6.4.2 Density Indicator, Transmitters (XX-DIT-XXX)

6.4.2.1 The density of Pollution Abatement System scrubber brine solutions for each incinerator is measured by a vibrating tube type primary sensing element and paired transmitter.

6.4.2.2 The accuracy of the primary sensing element is established by the manufacturer through the design. The calibration of the associated transmitter is done by the manufacturer and is valid over the operational lifetime of the primary sensing element/transmitter pair. The manufacturer provides the user with a certificate of calibration for each density primary sensing element/transmitter pair. The user programs the transmitter per manufacturer instructions.

6.4.2.3 The function and accuracy of the sensing element/transmitter pair is checked by taking a sample of the scrubber brine and determining the samples density by weighing the sample or using a hydrometer.

6.4.2.4 If the density of the sample is within ±2.0% of the value reported by the sensing element/transmitter pair, the instrument is determined to be functioning properly.

6.4.2.5 Proper operation of each density primary sensing element/transmitter pair is tested at least once every 180 days.

6.4.3 Flow Indicator, Transmitters (XX-FIT-XXX)

6.4.3.1 Flow rates of incinerator liquid waste feeds, incinerator PAS solutions, and incinerator exhaust gases are determined using mass flow meters, magnetic flow meters, and differential pressure sensors respectively.

6.4.3.2 Mass Flow Meters

6.4.3.2.1 Mass Flow Meters are used to measure the feed rate of chemical agent and spent decontamination solution to the primary and secondary chambers of the Liquid Incinerators. Each mass flow meter consists of a vibrating tube type primary sensing element and a transmitter, which are calibrated by the manufacturer. Mass flow meters are not calibrated by the user; rather the manufacturer provides the user with a certificate of calibration for each flow meter. The manufacturer's calibration is valid over the life of the instrument. For mass flow meters, the instrument error increases as the flow rate decreases. The instrument calibration will be maintained such that the accuracy is within ±0.4% at all flow rates above 10% of the maximum design flow rate.

6.4.3.2.2 The TOCDF uses two mass flow meters in series to measure the feed rate of chemical agent to the primary chamber of each Liquid Incinerator. This ensures accurate measurements of agent feed rates and the ability to determine proper operation of the mass flow meters. If the agent feed rates reported by each flow meter are within 5% of each other, the flow meters are determined to be functioning properly. If the flow rate values from each flow meter differ by greater than 5%, the flow meter causing the error will be repaired or replaced with a new factory calibrated one. The mass flow meter causing the error is determined by physical inspection and/or component continuity checks as described in literature provided by the manufacturer.

6.4.3.2.3 Since mass flow meters are calibrated by the manufacturer, preventative maintenance performed by the user is limited to checking the "zero value" of each flowmeter (i.e., at flow rates of 0.0 lbs/hr transmitter output should be 4.0 milliamps) and resetting the "zero value" if necessary. The "zero value" of each mass flow meter is checked at least once every 180 days.

6.4.3.3 Electro-Magnetic Flow Meters

6.4.3.3.1 Electro-Magnetic Flow Meters are comprised of a primary sensing element and a transmitter. The primary sensing element is located in a section of piping of known cross sectional area. The accuracy of the primary sensing element is established by the manufacturer through the design.

6.4.3.3.2 The transmitter associated with each magnetic flow meter is calibrated by the user. A frequency generator integrated within the transmitter as part of the flow meter's self-diagnostic system simulates the flow of liquids through the meter. Frequencies equivalent to zero and 100 percent of span are injected into the transmitter and the resulting milliamp output of the transmitter is evaluated and adjusted if necessary.

6.4.3.3.3 Electro-Magnetic flow meter transmitters are determined to be properly calibrated if the output of the transmitter is the expected value ±1.0% of the transmitter's span. Magnetic flow meters are calibrated at least once every 180 days.

6.4.4 Differential Pressure Indicator, Transmitters (XX-PDIT-XXX)

6.4.4.1 Differential pressure measurements are used to determine flow rates of exhaust gases through each incinerator. A differential pressure measurement requires a transmitter capable of receiving and measuring the difference between a low and a high-pressure input.

6.4.4.2 Differential pressure indicating transmitters are calibrated by removing the low and high-pressure inputs to the transmitters. The low-pressure leg of the transmitter is then exposed to atmospheric pressure. The high-pressure leg of the transmitter is exposed to five successive increasing pressures using either a hand pump or compressed gas.

6.4.4.3 The transmitter is determined to be properly calibrated if the four to 20 milliamp output of the transmitter (when exposed to each of the five successive pressures) is the expected value ±1.0% of the transmitter's span. Differential pressure transmitters are calibrated at least once every 360 days.

6.4.5 Level Indicator, Transmitters (XX-LIT-XXX)

6.4.5.1 Levels of liquids stored in permitted hazardous waste tanks and small vessels associated with the Agent Quantification System are determined using either differential pressure transmitters, or ultrasonic or radar level sensors.

6.4.5.2 Differential Pressure Transmitters

6.4.5.2.1 Differential pressure transmitters are designated in the TAG ID alpha code with the letters LIT when used in liquid level measurement applications. The low-pressure leg of the transmitter is exposed to atmospheric pressure, while the high pressure leg is exposed to the pressure head created by the column of liquid stored in the tank.

6.4.5.2.2 Differential pressure transmitters used in tank liquid level applications are calibrated in the same manner and at the same frequency as those used to determine incinerator exhaust gas flow rates (i.e., XX-PDIT-XXX).

6.4.5.3 Ultrasonic and Radar Level Transmitters

6.4.5.3.1 Ultrasonic level sensors determine the distance between the liquid level surface and the face of the level sensor by measuring the time required for a sound pulse sent out from the sensor to be reflected off the liquid surface and return to the sensor. Radar level indicators make this same measurement using a radio frequency pulse.

6.4.5.3.2 The function/accuracy of ultra sonic level detector is tested using features included in the sensor/transmitter pair. The sensor generates artificial inputs to the transmitter at a frequency equivalent to that which the transmitter would receive if the tank were empty.

The sensor then repeats the process, generating inputs to the transmitter at a frequency equivalent to that which the transmitter would receive if the tank were full.

6.4.5.3.3 The output from the transmitter should be four and 20 milliamps respectively ±1.0% of the transmitter's span. Ultrasonic and radar transmitters are calibrated at least once every 180 days or 360 days as specified in the tables at the end of this Attachment.

6.4.6 Level Switches (XX-LSHH-XXX)

6.4.6.1 Sonic level switches are used in permitted tank control systems to prevent the tanks from being filled beyond their capacities. Level switches are function checked to ensure proper operation by removing the switch and immersing it in liquid. The function of each level switch is tested at least once every 360 days.

6.4.7 Temperature Indicator, Transmitters (XX-TIT-XXX, XX-TT-XXX)

6.4.7.1 Temperature transmitters are calibrated using a hand-held calibrations instrument, which simulates the thermocouple millivolt, output that is input to the transmitter by the thermocouple.[2] Five calibration points are injected into the transmitter and the resulting milliamp outputs are evaluated.

6.4.7.2 The transmitter is determined to be properly calibrated if the four to 20 milliamp output of the transmitter is the expected value ±1.0% of the instrument's span. Temperature transmitters are calibrated at least once every 90 days or 180 days as specified in the Tables at the end of this Attachment.

6.4.8 Current Switches (XX-TSLL-XXX and XX-PSHH-XXX)

6.4.8.1 Current switches are used in some temperature and pressure control loops to activate waste feed interlocks. The current switch is placed in series after the temperature or pressure transmitter. The current switch is adjusted so that it opens/closes at a threshold milliamp value (i.e., the setpoint). Current switches are calibrated using a hand-held calibrator, which simulates the input normally provided by a temperature or pressure transmitter.

6.4.8.2 Each current switch is determined to be in calibration when it activates at a milliamp value equivalent to the setpoint ±1.0% instrument's span. Current switches are calibrated at least once every 360 days.

6.4.9 Temperature Switches (XX-TSHH-XXX)

6.4.9.1 Filled-system-type temperature switches are used on each incinerator to stop or prevent waste feed if an incinerator's PAS quench tower exhaust gas temperature exceeds the limit established through Permit conditions. Filled-system-type temperature switches are calibrated by exposing the sensing element of the switch to a region of known temperature.

[2] Thermocouples are not calibrated. The accuracy of a thermocouple over a specific temperature range is determined by the materials of construction and design.

6.4.9.2 Each temperature switch is determined to be properly calibrated if the switch activates at temperatures equivalent to the setpoint ±1.0% of the transmitter's span. Filled-system-type temperature switches are calibrated at least once every 360 days.

6.4.10 Pressure Indicator, Transmitters (XX-PIT-XXX)

6.4.10.1 Diaphragm-type pressure sensors are used to measure and/or control process operating parameters associated with each incinerator's primary chamber pressure, quench brine delivery pressure to venturi scrubbers, and clean liquor delivery pressure to scrubber tower spray bars.

6.4.10.2 The transmitter associated with diaphragm-type pressure sensors are calibrated using a hand air pump or compressed gas to pressurize the diaphragm. The diaphragm is subjected to five different pressures ranging from 0 to 100% of the pressures the transmitter is set to span. The resulting output of the transmitter is then evaluated.

6.4.10.3 Pressure transmitters are determined to be properly calibrated if the transmitter's four to 20 milliamp output is the expected value ±1.0% of the instrument's span. Pressure transmitters are calibrated at least once every 180 days.

6.4.11 Pressure Switches (XX-PSHH-XXX, XX-PSL-XXX, XX-PSLL-XXX)

6.4.11.1 Pressure Switches are used to stop or prevent waste feed to each incinerator when primary chamber pressures exceed limits imposed by this Permit. Pressure switches are calibrated by injecting a pressure into the switch equivalent to the switch’s setpoint.

6.4.11.2 Pressure switches (PSHH) are determined to be properly calibrated if the switch activates at pressures equivalent to the setpoint ±3.0% of the instrument's span. Pressure switches are calibrated at least once every 180 days.

6.4.11.3 Pressure switches (PSL and PSLL) are determined to be properly calibrated if the switch activates at pressures equivalent to the setpoint ±1.0% of the instrument's span. Pressure switches are calibrated at least once every 180 days.

6.4.12 Weight Indicator, (Transmitters XX-WIT-XXX)

6.4.12.1 Load Cells are used in the determination of the heel of chemical agent remaining in bulk containers drained at the Bulk Drain Stations and control the feed rate of chemical agent to the Metal Parts Furnace. The load cells may be used to weigh the miscellaneous wastes to the MPF to verify that permit feed rates are not exceeded. They may also be used to quantify the amount of miscellaneous agent contaminated liquids (hydraulic fluid, fuel oil, lubricating oil, etc.) that will be transferred to the ACS tanks.

6.4.12.2 The transmitters associated with load cells convert and scale the millivolt output of the load cell to a four to 20 milliamp control signal. A calibrator is used to simulate the millivolt output of the load cell to the transmitter. The resulting output of the transmitter is then evaluated. Load cell transmitters are determined to be properly calibrated if the output of the transmitter resulting from a known input is that which is expected ±0.2% of the instrument's span. Transmitters associated with the load cells are calibrated at least once every 90 days.

6.4.12.3. A scale in the TMA may also be used to quantify the amount of miscellaneous waste and miscellaneous agent contaminated liquids (hydraulic fluid, fuel oil, lubricating oil, etc.) that will be transferred to the ACS tanks. This scale will be calibrated once every 360 days by placing a known weight on the scale and adjusting the scale as necessary to obtain an accuracy of ± 2% of the scales range. A record of this yearly calibration date, with results, shall be kept at the facility until the next calibration has been completed.

6.4.13 Chemical Agent Monitors

6.4.13.1 Automatic Continuous Air Monitoring Systems (ACAMS) are used to detect concentration of agent in exhaust gases.

6.4.13.2 The calibration and challenging of ACAMS is described in Attachments 3 (Sampling, Analytical, and QA/QC Procedures) and 22 (Agent Monitoring Plan).

6.5 R315-8-15.7(c) INCINERATOR WASTE FEED INTERLOCK FUNCTION TEST

6.5.1 The process control system of each incinerator is designed to stop or prevent waste feed when operating parameters exceed the limits specified in this Permit. This feature of the control system is referred to as the automatic waste feed cut-off (or waste feed interlock) system. Hazardous Waste regulations require owners and operators of an incinerator to periodically test this system.

6.5.2 The TOCDF procedure titled "Waste Feed Interlock Testing" (Document Number TE-SOP-301) specifies the interlock that must be tested, the methods used to test the interlocks, and the frequencies at which the tests are to be conducted. The procedure includes examples of the forms used to document the test results.[3]

6.5.3 The waste feed interlocks are tested using one of two methods: (1) an automated method using PLC software that allows inputs of simulated signals into the logic of the field PLCs; or (2) a manual method that is used as a backup if the automated method is not functional. The Permittee shall document in the Operating Record the reason(s) why the automated method was not used and the action(s) taken to correct any problems with the automated method. Waste shall not be fed to the affected furnace(s) during the waste feed interlock test. The manual backup method for testing the waste feed interlocks is as follows:

6.5.3.1 Waste feed interlocks are either activated when the four to 20 milliamp control signal output from a transmitter exceeds a setpoint residing in the process control software or when the value of a process parameter exceeds the setpoint of a switch and causes the switch to open.

[3] The procedure to test the overtop protection systems associated with tanks as required by R315-8-10 [40 CFR 264.195(a)] are included in this procedure.

6.5.3.2 For waste feed interlocks activated when the magnitude of operating parameters cause the analog value of the four to 20 milliamp control signal output from a transmitter to exceed a setpoint residing in the process control software, the instrument technician injects an artificial control signal into the process control system that is greater or less than the value equivalent to the setpoint. The artificial control signal is injected at the location where the transmitter's output leads connect to the programmable logic controller.

6.5.3.3 For waste feed interlocks activated by a change in state of a switch (i.e., contacts closed to contacts open), the instrument technician will cause a change in state of the control loop associated with the interlock being tested by opening (or removing) the fuse to the loop.[4]

6.5.3.4 The ACAMS associated with the waste feed interlocks are tested either automatically or manually as described in Section 6.5.3. Each ACAMS is tested for a malfunction alarm. The ACAMS associated with the common stack are additionally tested for a "non-staggered" alarm.

6.5.4 The automated testing method produces a report documenting the testing of the waste feed interlocks that is prepared using a feature included with the waste feed interlock function test software. The alarms associated with the interlock function test shall be observed and verified by the Control Room Operator of the affected furnace. The observed time of each interlock alarm shall be included with the report. When using the manual backup testing methods, the control room operator observes the activation of each waste feed interlock on the incinerator-specific "RCRA Alarm Summary Screen" and records the time of its activation.

6.5.4.1 The reports of the interlock function tests and alarm verifications for each furnace system and tank system shall be included in the Operating Record.

6.5.4.2 The interlock function test report shall verify that all appropriate interlocks occur (e.g., the common stack ACAMS alarm causes an interlock to automatically prevent the waste feed to all of the furnaces.)

6.5.5 Proper function of the entire waste feed interlock system is demonstrated by:

6.5.5.1 The proper operation of instrumentation causing waste feed interlocks is ensured and demonstrated by compliance with the calibration methods and frequencies established in the calibration plan,

6.5.5.2 Successful completion of the waste feed interlock function test demonstrates the absence of hardwire jumpers, software jumpers, or both within the portion of the process control logic (i.e., software) that stops and prevents waste feed.

6.5.5.3 Successful completion of the waste feed interlock function test demonstrates the proper function of the PLC, the PLC code associated with stopping or preventing waste feed, and the values of the setpoints used to stop or prevent waste feed.

[4] The Level Switch High High (LSHH), which when activated, prevents continued liquid feed to tank HWMU are tested the same way as incinerator waste feed interlocks that are activated by switches.

6.5.5.4 The design of the control system includes continual control loop self diagnostic checks. The process control system components are designed to fail safe (e.g., a failed thermocouple causes the associated transmitter to ramp to its high range, which in turn activates a waste feed interlock).

6.5.6 The waste feed interlocks required to be tested are those associated with operating parameters which have a corresponding Permit Condition limitation.

6.5.7 The frequency at which the testing of the waste feed interlock system of each incinerator occurs is at least once every 14 days unless the incineration system has been shut down. If the incineration system has been shut down, the waste feed interlock system will be tested before waste feed is introduced. The interlock system shall be tested every 14 days when the furnace is idling or processing waste. Waste feed shall not occur to the effected incinerator during the waste feed interlock test.

6.5.8 The frequency of testing of the overtop protection system of each tank is at least once every 14 days.

6.5.9 The frequency of testing of the BRA waste feed interlock system is at least once every 14 days.

6.5.10 Although minor modifications to the procedure may occur, portions of the procedure that shall not be changed without prior approval by the Executive Secretary are:

6.5.10.1 The methods used to test waste feed interlocks.

6.5.10.2 The interlocks required to be tested.

6.5.10.3 The frequency at which the function test occurs which is specified as once every 14 days, as indicated in Section 6.5.7.

6.6 PROCESS DATA INSTRUMENTATION CALIBRATION & WASTE FEED INTERLOCK TABLES

6.6.1 The following tables list (by incinerator, Subpart X, and tank) the TAG IDs of process instrumentation whose proper function is required to demonstrate compliance with Permit conditions and stop or prevent waste feed when operating parameters exceed the limits established through the Conditions of this Permit.

6.6.2 Under the column heading "Process Data Instrument TAG ID," transmitters are referenced rather than control loops because it is the transmitters that physically exist as instruments. It is the transmitters that must be calibrated properly to ensure precise process control and accurate data generation.

6.6.3 Process data generated from the output of these transmitters is electronically recorded by the Process Data Acquisition & Recording System (PDARS). The outputs of the transmitters listed are continuously monitored by the Programmable Logic Controllers (PLC), however process variables residing in the registers of the PLC are recorded by PDARS.

6.6.4 The activation and duration of waste feed interlocks (listed in the following tables by alarm/switch TAG IDs) are recorded by PDARS also.

6.6.5 PDARS reports are formatted to present the hourly maximum and minimum values of each parameter listed.

6.6.6 The tables for all incinerators list two scrubber brine pH analyzer transmitter TAG IDs (A and B). The value appearing on the PDARS report associated with each incinerator is the "process variable" (a value that exists in a register of the controller which is the actual pH of the scrubber brine that is compared by the PLC to the setpoint). Each scrubber brine pH analyzer is a complete separate system. Only one of the pH analyzer systems is active at any one time and the system that is active is rotated on equal time intervals. It is the active system that provides the process variable to the controller and it is the process variable that appears on the PDARS reports.

6.6.7 Each exhaust gas carbon monoxide (CO) 60-minute rolling average is composed of the previous 60 one-minute averages. Each one-minute average is composed of four instantaneous CO readings taken 15 seconds apart.

6.6.8 Tables 6-B and 6-C include control loop temperature TAG IDs appearing in bold print; signifying two thermocouple/transmitter pairs are used to measure the temperature. Controllers receiving inputs from two thermocouples/transmitter pairs activate combustion chamber high and low temperature AWFCOs based on the most conservative termperature measured. The PLC is programmed to activate high and low temperature combustion chamber AWFCOs based on the thermocouple/transmitter pair measuring the highest temperature when the high temperature limit is approached, and the pair measuring the lowest temperature when the low temperature limit is approached.

TABLE 6-A-1
LIQUID INCINERATOR #1
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device®	Instrument Range	Accuracy	Calibration/Preventative Maintenance Frequency	Calibration/Preventative Maintenance Method
1	Agent Feed Rate to Primary Chamber	13-FIT-127A 13-FIT-127B	Mass Flowmeter Vibrating U-Tube Type	0 - 1,500 lbs/hr	± 0.4% of Flow	180 days	6.4.3.2
2	Agent Feed Atomizing Air Pressure	13-PIT-128	Diaphragm	0 - 200 psig	± 1.0% of Span	180 days	6.4.10
3	Agent Gun Nozzle Pressure	13-PIT-112	Diaphram	0 - 25 psig	± 1.0% of Span	180 days	6.4.10
4	Reserved						
5	Primary Chamber Exhaust Gas Temperature	13-TIT-610	Thermocouple	212 - 3,000° F	± 1.0% of Span	180 days	6.4.7
6	Secondary Chamber Spent Decon/Process Water Feed Rate	13-FIT-102	Mass Flowmeter Vibrating U-Tube Type	0 - 2,250 lbs/hr	± 0.4% of Flow	180 days	6.4.3.2
7	Secondary Chamber Spent Decon/Process Atomizing Air Pressure Waste Feed Interlock	13-PSL-058	Diaphragm	12 - 100 psig	± 1.0% of Span	180 days	6.4.11
8	Secondary Chamber Slag Gate Open Waste Feed Interlock	13-ZS-367B	Limit Switch	Not Applicable	Not Applicable	Not Applicable	Not Applicable
9	Secondary Chamber Exhaust Gas Temperature	13-TIT-129	Thermocouple	32 - 2,400° F	± 1.0% of Span	180 days	6.4.7
9.a	Secondary Chamber Exhaust Gas Temperature Low Gas Temperature Waste Feed Interlock	13-TSLL-129	Current Switch	4 - 20 mA	± 1.0% of Span	360 days	6.4.8
10	Slag Removal System Shell	13-TIT-374 13-TIT-375 13-TIT-376 13-TIT-377	Thermocouples	0 - 1000° F	± 1.0% of Span	180 days	6.4.7
11	V-Cone pressure to correct to standard conditions	24-PIT-9431	Diaphram	8-13 psia	± 1.0% of Span	180 days	6.4.1
11a	V-Cone temperature to correct to standard conditions	24-TIT-9431	Thermocouple	100-200° F	± 1.0% of Span	180 days	6.4.7
11b	V-Cone flow rate	24-FIT-9431A 24-FIT-9431B	D/P Cell	0-14,760 cfm	± 1.0% of Span	180 days	6.4.4
12	Quench Tower Exhaust Gas Temperature	24-TIT-397	Thermocouple	0 - 300° F	± 1.0% of Span	90 days	6.4.7
12.a	Quench Tower Exhaust Gas Temperature High Waste Feed Interlock	24-TSHH-089	Filled System	175 - 360° F	± 1.0% of Span	360 days	6.4.9
13	Quench Brine Delivery Pressure	24-PIT-100	Diaphragm	0 - 150 psig	± 1.0% of Span	180 days	6.4.10
14	Quench Brine to Venturi Scrubber	24-FIT-088	Electro-Magnetic Flowmeter	0 - 150 gpm	± 1.0% of Span	180 days	6.4.3.3
15	Venturi Scrubber Δ Pressure	24-PDIT-090	D/P Cell	–0-70in. w.c.	± 1.0% of Span	360 days	6.4.4
16	Clean Liquor to Scrubber Tower Sprays	24-FIT-112	Electro-Magnetic Flowmeter	0 - 1,000 gpm	± 1.0% of Span	180 days	6.4.3.3
17	Clean Liquor Delivery Pressure	24-PIT-129	Diaphragm	0 - 100 psig	± 1.0% of Span	180 days	6.4.10
18	Scrubber Liquid Effluent pH	24-AIT-091A 24-AIT-091B	Electrodes	0 - 14 pH Units	± 2.0% of Span	7 days	6.4.1.2
19	Scrubber Liquid Effluent Specific Gravity	24-DIT-083	Magnetically Vibrated Tube	0.6 - 1.4 SGU	± 2.0% of Span	180 days	6.4.2
20	Blower Exhaust Gas CO	24-AIT-078	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1

TABLE 6-A-1
LIQUID INCINERATOR #1
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device*	Instrument Range	Accuracy	Calibration/Preventative Maintenance Frequency	Calibration/Preventative Maintenance Method
21	Blower Exhaust Gas CO	13-AIT-083	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
22	Blower Exhaust Gas O_2	24-AIT-210	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
23	Blower Exhaust Gas O_2	13-AIT-229	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
24	Blower Exhaust Gas Agent	PAS 704AH PAS 704BH	ACAMS	0 - 512 SEL	±25% of Response	Challenge daily, calibrate if it fails the challenge	6.4.13
25	Common Stack Exhaust Gas Agent	PAS 701AG PAS 701BG PAS 701CG PAS 706AV PAS 706BV PAS 706CV PAS 707AH PAS 707BH PAS 707VH	ACAMS	0 - 512 SEL	±25% of Response	Challenge every 4 hours, calibrate if it fails the challenge	6.4.13
26	HVAC Stack Exhaust Gas Agent[1]	FIL 601CH FIL 601DH	ACAMS	0 - 512 VSL	±25% of Response	Challenge every 24 hours[2], calibrate if it fails the challenge	6.4.13
		FIL 601EG[3] FIL 601FG[3] FIL 601AV[3] FIL 601BV[3]	DAAMS	VSL	±40% of Response	Line Challenge every 60 days ± 3 days	

1. The HVAC ACAMS causes a staged shutdown as described in Module X.
2. The ACAMS shall be challenged every 24 hours with a 1-hour grace period before or after the 24-hour deadline.
3. The GB and VX are historical monitors

TABLE 6-A-2
LIQUID INCINERATOR #2
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration/ Preventative Maintenance Method
1	Agent Feed Rate to Primary Chamber	13-FIT-731A 13-FIT-731B	Mass Flowmeter Vibrating U-Tube Type	0 - 1,500 lbs/hr	±0.4% of Flow	180 days	6.4.3.2
2	Agent Feed Atomizing Air Pressure	13-PIT-736	Diaphragm	0 - 200 psig	± 1.0% of Span	180 days	6.4.10
3	Agent Gun Nozzle Pressure	13-PIT-760	Diaphragm	0 - 25 psig	± 1.0% of Span	180 days	6.4.10
4	Reserved						
5	Primary Chamber Exhaust Gas Temperature	13-TIT-710	Thermocouple	212 - 3,000° F	± 1.0% of Span	180 days	6.4.7
6	Secondary Chamber Spent Decon/Process Water Feed Rate	13-FIT-763	Mass Flowmeter Vibrating U-Tube Type	0 - 2,250 lbs/hr	± 0.4% of Flow	180 days	6.4.3.2
7	Secondary Chamber Spent Decon/Process Atomizing Air Pressure Waste Feed Interlock	13-PSL-809	Diaphragm	12 - 100 psig	± 1.0% of Span	180 days	6.4.11
8	Secondary Chamber Slag Gate Open Waste Feed Interlock	13-ZS-567B	Limit Switch	Not Applicable	Not Applicable	Not Applicable	Not Applicable
9	Secondary Chamber Exhaust Gas Temperature	13-TIT-782	Thermocouple	32 - 2,400° F	± 1.0% of Span	180 days	6.4.7
9.a	Secondary Chamber Exhaust Gas Temperature Low Gas Temperature Waste Feed Interlock	13-TSLL-782	Current Switch	4 - 20 mA	± 1.0% of Span	360 days	6.4.8
10	Slag Removal System Shell	13-TIT-574 13-TIT-575 13-TIT-576 13-TIT-577	Thermocouples	0 - 1000° F	± 1.0% of Span	180 days	6.4.7
11	V-Cone Pressure Production Rate	24-PIT-9902	Diaphram	8-13 psia	± 1.0% of Span	180days	6.4.10
11a	V-Cone Temperature	24-TIT-9902	Thermocouple	100-200°F	± 1.0% of Span	180 days	6.4.7
11b	V-Cone flow rate	24-FIT-9902A 24-FIT-9902B	D/P Cell	0-14,760 cfm	± 1.0% of Span	180 days	6.4.4
12	Quench Tower Exhaust Gas Temperature	24-TIT-816	Thermocouple	0 - 300° F	± 1.0% of Span	90 days	6.4.7
12.a	Quench Tower Exhaust Gas Temperature High Waste Feed Interlock	24-TSHH-800	Filled System	175 - 360° F	± 1.0% of Span	360 days	6.4.9
13	Quench Brine Delivery Pressure	24-PIT-838	Diaphragm	0 -150 psig	± 1.0% of Span	180 days	6.4.10
14	Quench Brine to Venturi Scrubber	24-FIT-828	Electro-Magnetic Flowmeter	0 - 150 gpm	± 1.0% of Span	180 days	6.4.3.3
15	Venturi ScrubberΔ Pressure	24-PDIT-814	D/P Cell	–0-70in. w.c.	± 1.0% of Span	360 days	6.4.4
16	Clean Liquor to Scrubber Tower Sprays	24-FIT-825	Electro-Magnetic Flowmeter	0 - 1,000 gpm	± 1.0% of Span	180 days	6.4.3.3
17	Clean Liquor Delivery Pressure	24-PIT-839	Diaphragm	0 - 100 psig	± 1.0% of Span	180 days	6.4.10
18	Scrubber Liquid Effluent pH	24-AIT-831A 24-AIT-831B	Electrodes	0 - 14 pH Units	± 2.0 of Span	7 days	6.4.1.2
19	Scrubber Liquid Effluent Specific Gravity	24-DIT-835	Magnetically Vibrated Tube	0.6 - 1.40 SGU	±2.0% of Span	180 days	6.4.2

TABLE 6-A-2
LIQUID INCINERATOR #2
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration/ Preventative Maintenance Method
20	Blower Exhaust Gas CO	24-AIT-716	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
21	Blower Exhaust Gas CO	13-AIT-778	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
22	Blower Exhaust Gas O_2	24-AIT-717	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
23	Blower Exhaust Gas O_2	13-AIT-798	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
24	Blower Exhaust Gas Agent	PAS 705AH PAS 705BH	ACAMS	0 - 512 SEL	±25% of Response	Challenge daily, calibrate if it fails the challenge	6.4.13
25	Common Stack Exhaust Gas Agent	PAS 701AG PAS 701BG PAS 701CG PAS 706AV PAS 706BV PAS 706CV PAS 707AH PAS 707BH PAS 707CH	ACAMS	0 - 512 SEL	±25% of Response	Challenge every 4 hours, calibrate if it fails the challenge	6.4.13
26	HVAC Stack Exhaust Gas Agent[1]	FIL 601 CH FIL 601 DH	ACAMS	0-512 VSL	±25% of Response	Challenge every 24 hours[2], calibrate if it fails the challenge	6.4.13
		FIL 601 EG[3] FIL 601 FG[3] FIL 601AV[3] FIL 601 BV[3]	DAAMS	VSL	±40% of Response	Line Challenge every 60 ± 3 days	

1. The HVAC ACAMS causes a staged shutdown as described in Module X.
2. The ACAMS shall be challenged every 24 hours with a 1-hour grace period before or after the 24-hour deadline.
3. The GB and VX are historical monitors

TABLE 6-B
METAL PARTS FURNACE
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Control Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
1	MPF Primary Chamber Temperature Zone 1	14-TIT-152 14-TIT-391	Thermocouple	0 - 2,000° F	± 1.0% of Span	180 days	6.4.7
2	MPF Primary Chamber Temperature Zone 2	14-TIT-141 14-TIT-392	Thermocouple	0 - 2,000° F	± 1.0% of Span	180 days	6.4.7
3	MPF Primary Chamber Temperature Zone 3	14-TIT-153 14-TIT-393	Thermocouple	0 - 2,000° F	± 1.0% of Span	180 days	6.4.7
4	MPF Primary Chamber Exhaust Gas Temperature	14-TIT-010	Thermocouple	32 - 2700° F	± 1.0% of Span	180 days	6.4.7
5	MPF Primary Chamber Pressure	14-PIT-070	D/P Cell	-10.0 - 0.0 in. w.c.	± 1.0% of Span	180 days	6.4.10
5.a.	MPF Primary Chamber Pressure High Waste Feed Interlock	14-PSHH-034	Current Switch	19.85 mA	± 1.0% of Setpoint	360 days	6.4.8
6	MPF Afterburner Temperature	14-TIT-065 14-TIT-069	Thermocouple	32 - 2,700° F	± 1.0% of Span	180 days	6.4.7
7	V-Cone Pressure	24-PIT-9667	Diaphram	8-15 psia	± 1.0% of Span	180 days	6.4.10
7a	V-Cone Temperature	24-TIT-9667	Thermocouple	100-200 °F	± 1.0% of Span	180 days	6.4.7
7b	V-Cone flow rate	24-FIT-9667A 24-FIT-9667B	D/P Cell	0-16,990cfm	± 1.0% of Span	180 days	6.4.4
8	Quench Tower Exhaust Gas Temperature	24-TIT-509	Thermocouple	0 - 300° F	± 1.0% of Span	90 days	6.4.7
8.a	Quench Tower Exhaust Gas Temperature High Waste Feed Interlock	24-TSHH-223	Filled System	175 - 360° F	± 1.0% of Span	360 days	6.4.9
9	Venturi Scrubber Differential Pressure	24-PDIT-222	D/P Cell	0 - 50 in. w.c.	± 1.0% of Span	360 days	6.4.4
10	Quench Brine to Venturi Scrubber	24-FIT-218	Electro-Magnetic Flowmeter	0 - 150 gpm	± 1.0% of Span	180 days	6.4.3.3
11	Quench Brine Pressure	24-PIT-233	D/P Cell	0 - 150 psig	± 1.0% of Span	180 days	6.4.10
12	Clean Liquor to Scrubber Tower Sprays	24-FIT-248	Electro-Magnetic Flowmeter	0 - 1,000 gpm	± 1.0% of Span	180 days	6.4.3.3
13	Clean Liquor Delivery Pressure	24-PIT-258	D/P Cell	0 - 100 psig	± 1.0% of Span	180 days	6.4.10
14	Scrubber Liquid Effluent Specific Gravity	24-DIT-216	Magnetically Vibrated Tube	0.6 - 1.4 SGU	±2.0% of Span	180 days	6.4.2
15	Scrubber Liquid Effluent pH	24-AIT-224A 24-AIT-224B	Electrodes	0 - 14 pH Units	± 2.0 pH Span	7 days	6.4.1.2
16	Blower Exhaust Gas CO	14-AIT - 384	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
17	Blower Exhaust Gas CO	24-AIT-669	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
18	Blower Exhaust Gas O_2	14-AIT-082	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
19	Blower Exhaust Gas O_2	24-AIT-670	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
20	Blower Exhaust Gas Agent	PAS 703AH PAS 703BH PAS 703 C PAS 703D	ACAMS	0 - 512 SEL	± 25% of Response	Challenge every 4 hours for VX or daily for GB or mustard calibrate if it fails the challenge	6.4.13

TABLE 6-B
METAL PARTS FURNACE
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Control Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
21	Common Stack Exhaust Gas Agent	PAS 701AG PAS 701BG PAS 701CG PAS 706AV PAS 706BV PAS 706CV PAS 707AH PAS 707BH PAS 707CH	ACAMS	0 - 512 SEL	± 25% of Response	Challenge every 4 hours, calibrate if it fails the challenge	6.4.13
22	Load Cell, BDS-101	49-WIT-152	Load Cell	0 -10,000 lbs	± 0.20% of Span	Every 90 days	6.4.12
23	Load Cell, BDS-102	49-WIT-252	Load Cell	0 -10,000 lbs	± 0.2% of Span	Every 90 days	6.4.12
24	Agent Quantification System MDM-101	51-LIT-073	DP Level Indicating Transmitter	0-25 in. w.c.	± 1.0% of Span	360 days	6.4.5.2
25	Agent Quantification System MDM-102	51-LIT-083	DP Level Indicating Transmitter	0-25 in. w.c.	± 1.0% of Span	360 days	6.4.5.2
26	Agent Quantification System MDM-103	51-LIT-093	DP Level Indicating Transmitter	0-25 in. w.c.	± 1.0% of Span	360 days	6.4.5.2
27	HVAC Stack Exhaust Gas Agent[1]	FIL 601CH FIL 601 DH	ACAMS	0-512 VSL	±25% of Response	Challenge every 24 hours[2], calibrate if it fails the challenge	6.4.13
		FIL 601 EG[3] FIL 601 FG[3] FIL 601AV[3] FIL 601BV[3]	DAAMS	VSL	±40% of Response	Line challenge every 60 ± 3 days	

1. The HVAC ACAMS causes a staged shutdown as described in Module X.
2. The ACAMS shall be challenged every 24 hours with a 1-hour grace period before or after the 24-hour deadline.
3. The GB and VX are historical monitors

TABLE 6-C
DEACTIVATION FURNACE SYSTEM
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENT CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
1	Jammed Chute Line A Waste Feed Interlock	16-XS-207	Radioactive Proximity Switch	On-Off	Non Applicable	Not Applicable	Not Applicable
2	Jammed Chute Line B Waste Feed Interlock	16-XS-209	Radioactive Proximity Switch	On-Off	Non Applicable	Not Applicable	Not Applicable
3	Reserved						
4	Reserved						
5	Kiln Rotational Speed Calculated from:	16-ZX-602	Proximity Switch	Not Applicable	Not Applicable	Not Applicable	Not Applicable
7	Kiln Pressure	16-PIT-018	Diaphragm	-2.0 to 1.0 in. w.c.	± 1.0% of Span	180 days	6.4.10
7.a	Kiln Pressure High Waste Feed Interlock	16-PSHH-204	Diaphragm	-0.5 to 0.5 in. w.c.	± 3.0% of Setpoint	180 days	6.4.11
8	Kiln Exhaust Temp Pre Quench	16-TIT-182 16-TIT-244	Thermocouple	0 - 2,300° F	± 1.0% of Span	180 days	6.4.7
9	Kiln Exhaust Temp.Post Quench	16-TIT-008 16-TIT-169	Thermocouple	0 - 2,300° F	± 1.0% of Span	180 days	6.4.7
10	Discharge Conveyor Temperature (lower)	16-TIT-042	Thermocouple	0 - 1,600° F	± 1.0% of Span	180 days	6.4.7
11	Discharge Conveyor Temperature (upper)	16-TIT-184	Thermocouple	0 - 1,600° F	± 1.0% of Span	180 days	6.4.7
12	Discharge Conveyor Tip Gate Jam Waste Feed Interlock	16-XS-058	Radioactive Limit Switch	Not Applicable	Not Applicable	Not Applicable	Not Applicable
13	Discharge Conveyor Slide Gate Jam Waste Feed Interlock	16-XS-821	Radioactive Limit Switch	Not Applicable	Not Applicable	Not Applicable	Not Applicable
14	Discharge Conveyor Speed Low Waste Feed Interlock	16-SSL-057	Speed (Proximity) Switch	On-Off	Not Applicable	Not Applicable	Not Applicable
15	Exhaust Gas Afterburner	16-TIT-092 16-TIT-003	Thermocouple	0 - 2,400° F	± 1.0% of Span	180 days	6.4.7
16	V-Cone Pressure	24-PIT-9430	Diaphram	8-13 psia	± 1.0% of Span	180 days	6.4.10
16a	V-Cone Temperature	24-TIT-9430	Thermocouple	100-200 °F	± 1.0% of Span	180 days	6.4.7
16b	V-Cone flow rate	24-FIT-9430A 24-FIT-9430B	D/P Cell	0-38,126 acfm	± 1.0% of Span	180 days	6.4.4
17	Quench Tower Exhaust Gas Temperature	24-TIT-374	Thermocouple	0 - 300° F	± 1.0% of Span	90 days	6.4.7
17.a	Quench Tower Exhaust Gas High Temp Waste Feed Interlock	24-TSHH-001	Filled System	175 - 360° F	± 1.0% of Span	360 days	6.4.9
18	Scrubber Liquid Effluent Specific Gravity	24-DIT-033	Magnetically Vibrated Tube	0.6 - 1.40 SGU	± 2.0% of span	180 days	6.4.2
19	Scrubber Liquid Effluent pH	24-AIT-007A 24-AIT-007B	Electrode	0 - 14 pH Units	± 2.0% Span	7 days	6.4.1.2
20	Quench Brine Pressure	24-PIT-011	Diaphragm	0 - 200 psig	± 1.0% of Span	180 days	6.4.10
21	Quench Brine to Venturi Scrubber	24-FIT-006	Electro-magnetic Flowmeter	0 - 400 GPM	± 1.0% of Span	180 days	6.4.3.3
22	Venturi Scrubber Differential Pressure	24-PDIT-008	D/P Cell	0 - 50 in. w.c.	± 1.0% of Span	360 days	6.4.4
23	Clean Liquor to Scrubber Tower Sprays	24-FIT-030	Electro-magnetic Flowmeter	0 - 3,000 GPM	± 1.0% of Span	180 days	6.4.3.3
24	Clean Liquor Pressure	24-PIT-036	Diaphragm	0 - 100 psig	± 1.0% of Span	180 days	6.4.10
25	Blower Exhaust Gas O_2	24-AIT-206	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
26	Blower Exhaust Gas O_2	16-AIT-175	Zirconium Oxide Cell	0 - 25%	± 0.5% of	CD: daily	6.4.1.1

TABLE 6-C
DEACTIVATION FURNACE SYSTEM
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENT CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
			Analyzer		O_2	CE: quarterly PST: annually	
27	Blower Exhaust Gas CO	24-AIT-207	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
28	Blower Exhaust Gas CO	16-AIT-059	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
31	Blower Exhaust Gas Agent	PAS 702AH PAS 702BHG PAS 702C PAS 702D	ACAMS	0 - 512 SEL	± 25% of Response	Challenge every 4 hours for VX or daily for GB, mustard, calibrate if it fails the challenge	6.4.13
32	Common Stack Exhaust Gas Agent	PAS 701AG PAS 701BG PAS 701CG PAS 706AV PAS 706BV PAS 706CV PAS 707AH PAS 707BH PAS 707CH	ACAMS	0 - 512 SEL	± 25% of Response	Challenge every 4 hours, calibrate if it fails the challenge	6.4.13
33	HVAC Stack Exhaust Gas Agent[1]	FIL 601CH FIL 601 DH	ACAMS	0-512 VSL	±25% of Response	Challenge every 24 hours[2], calibrate if it fails the challenge	6.4.13
		FIL 601 EG[3] FIL 601 FG[3] FIL 601AV[3] FIL 601BV[3]	DAAMS	VSL	±40% of Response	Line Challenge every 60 ± 3 days	

1. The HVAC ACAMS causes a staged shutdown as described in Module X.
2. The ACAMS shall be challenged every 24 hours with a 1-hour grace period before or after the 24-hour deadline.
3. The GB and VX are historical monitors

TABLE 6-D
TANK HAZARDOUS WASTE MANAGEMENT UNIT
PROCESS DATA & TANK OVERTOP PROTECTION INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
1	Agent Collection System ACS-TANK-101 Level Indicator	11-LIT-093	Radar Level Indicating Transmitter	6 - 90 in.	± 1.0% of Span	180 days	6.4.5.3
2	Agent Collection System ACS-TANK-101 High-High Level Interlock	11-LSHH-091	Sonic Level Switch	Interlock setpoint 7' 6" above tangent[2]	See NOTE 3	360 days	6.4.6
3	Agent Collection System ACS-TANK-102 Level Indicator	11-LIT-109	Radar Level Indicating Transmitter	6 - 105 in.	± 1.0% of Span	180 days	6.4.5.3
4	Agent Collection System ACS-TANK-102 High-High Level Interlock	11-LSHH-111	Sonic Level Switch	Interlock setpoint 8' 9" above tangent[2]	See NOTE 3	360 days	6.4.6
5	Spent Decon System SDS-TANK-101 Level Indicator	11-LIT-020	Ultrasonic Level Indicating Transmitter	0 - 107 in.	±1.0% of Span	180 days	6.4.5.3
6	Spent Decon System SDS-TANK-101 High-High Level Interlock	11-LSHH-018	Sonic Level Switch	Interlock setpoint 9' 5" above tangent[2]	See NOTE 3	360 days	6.4.6
7	Spent Decon System SDS-TANK-102 Level Indicator	11-LIT-030	Ultrasonic Level Indicating Transmitter	0 - 107 in.	± 1.0% of Span	180 days	6.4.5.3
8	Spent Decon System SDS-TANK-102 High-High Level Interlock	11-LSHH-028	Sonic Level Switch	Interlock setpoint 9' 5" above tangent[2]	See NOTE 3	360 days	6.4.6
9	Spent Decon System SDS-TANK-103 Level Indicator	11-LIT-064	Ultra Sonic Level Indicating Transmitter	0 - 107 in.	± 1.0% of Span	180 days	6.4.5.3
10	Spent Decon System SDS-TANK-103 High-High Level Interlock	11-LSHH-062	Sonic Level Switch	Interlock setpoint 9' 5" above tangent[2]	See NOTE 3	360 days	6.4.6
11	Brine Reduction Area BRA-TANK-101 Level Indicator	23-LIT-003	Ultra-Sonic Level Indicating/transmitter	0 - 210 in.	± 1.0% of Span	360 days	6.4.5.3
12	Brine Reduction Area BRA-TANK-101 High-High Level Interlock	23-LSHH-002	Sonic Level Switch	Interlock setpoint 18' 3"	See NOTE 3	360 days	6.4.6
13	Brine Reduction Area BRA-TANK-102 Level Indicator	23-LIT-007	Ultra-Sonic Level Indicating/transmitter	0 - 210 in.	± 1.0% of Span	360 days	6.4.5.3
14	Brine Reduction Area BRA-TANK-102 High-High Level Interlock	23-LSHH-006	Sonic Level Switch	Interlock setpoint 18' 3"	See NOTE 3	360 days	6.4.6
15	Brine Reduction Area BRA-TANK-201 Level Indicator	23-LIT-703	Ultra-Sonic Level Indicating/transmitter	0 - 210 in.	± 1.0% of Span	360 days	6.4.5.3
16	Brine Reduction Area BRA-TANK-201 High-High Level Interlock	23-LSHH-702	Sonic Level Switch	Interlock setpoint 18' 3"	See NOTE 3	360 days	6.4.6
17	Brine Reduction Area BRA-TANK-202 Level Indicator	23-LIT-707	Ultra-Sonic Level Indicating/transmitter	0 - 210 in.	± 1.0% of Span	360 days	6.4.5.3
18	Brine Reduction Area BRA-TANK-202 High-High Level Interlock	23-LSHH-706	Sonic Level Switch	Interlock setpoint 18' 3"	See NOTE 3	360 days	6.4.6

NOTES:
[1] Reserved

[2] The tank tangent is the geometric transition where the cylindrical side meets the ellipsoidal bottom, approximately two inches below the head-to-shell weld.
[3] Level switches are not calibrated, they are function tested. The level at which they activate is not adjustable since each switch is positioned in the tank though a flanged opening in the side of the tank.